

Surplus or Shortage? Unraveling the Physician Supply Conundrum

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Although the supply of physicians in the United States has doubled during the past 20 years, there is still disagreement as to whether we currently have or should expect a significant surplus of physicians. The evidence suggests that despite the rapid expansion in the pool of available physicians, serious physician shortages persist for certain rural populations, ethnic and occupational groups, and other medically disadvantaged segments of the population. Medical students' declining interest in rural practice and primary care specialties suggests that problems of geographic and specialty maldistribution may worsen despite a rising population of physicians. It is unlikely that a significant physician surplus will develop unless there is a conscious attempt to limit the proportion of national wealth expended on medical care. Pockets of shortage can be reduced by broadening the availability of health insurance, lessening large income disparities between different specialties, changing the way teaching institutions are reimbursed for their training costs, and supporting direct governmental service programs such as the National Health Service Corps.

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The production of physicians should be increased beyond presently planned levels by a substantial expansion in the capacity of existing medical schools and by continued development of new schools.

The Report of the National Advisory Commission on Health Manpower, 1967¹

If medical school expansion is financed in order to create more doctors because some persons are without sufficient physicians' services, then it must be recognized that additional personnel will not necessarily make those services available to those very people.

RASHI FEIN
The Doctor Shortage: An Economic Diagnosis, 1967²

There will be too many physicians in 1990. There will be substantial imbalances in some specialties. There will continue to be a marked unevenness in the geographic distribution of physicians. (Emphases deleted.)

Summary Report of the Graduate Medical Education National Advisory Committee to the Secretary of Health and Human Services, 1980³

How many physicians does the United States need? The question is simple, but the answer is convoluted and controversial. Despite the plethora of studies that explore the issue of physician supply, different authors often arrive at different conclusions not only about how many physicians are needed, but on what policies should be adopted to ensure an adequate and appropriate number and mix of physicians in the future.

In this article we review the current debate about physician resources in an attempt to reconcile the widely divergent viewpoints about the number and type of physicians required by the United States. The underlying thesis of this discussion is that the question cannot be asked in a conceptual vacuum. To determine how many physicians should be trained in spe-

cific specialties, the dimensions of the health care system we are attempting to achieve must first be specified. The major source of controversy in the field of physician supply forecasting is a lack of agreement over the shape of an optimal health care system. This confusion is further compounded by the fact that the US health care system is in perpetual flux, which constantly modifies both the demand and the supply sides of the health professional forecasting equations.

Despite the lack of a firm foundation, it is possible to clarify the major alternatives available as this century wanes. To put the competing policy recommendations into some sort of reasonable conceptual context, we will attempt the following:

- Discuss the methodologic approaches that have been used to determine physician work-force needs and summarize the key projections of the major studies done in the past 30 years;
- Specify the competing assumptions about how the health care system should be constructed that lead to diverse recommendations about future attempts to shape physician supply;
- Examine some of the areas of present and future change that may modify any forecasts of physician supply or demand; and
- Offer some specific suggestions about further policy development in this field.

Physician Supply Forecasting—Science or Voodoo?

In theory, it should be simple to determine whether there are enough physicians. Two variables must be quantified: the need for physicians and the supply of physicians. A surplus exists when the supply exceeds the need; a shortage is the converse.

In fact, all work-force studies proceed from this conceptual framework. Unfortunately, it is often difficult to quantify

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ABBREVIATIONS USED IN TEXT

COGME = Council on Graduate Medical Education
 GMENAC = Graduate Medical Education National
 Advisory Committee
 HMO = health maintenance organization
 NHSC = National Health Service Corps

the variables in the human resources equation. Although it is relatively straightforward to count physicians, all physicians are not equal with respect to the amount of time they work, their relative productivity, or the value of the services they produce. How should the contribution of residents be weighted relative to that of physicians in practice for 20 years? Are women physicians more likely than male physicians to work part time? Do surgeons in health maintenance organizations work as hard as their peers in the fee-for-service sector?

The complexity of estimating physician supply pales in comparison with the much thornier problem of determining need. While the supply side of the equation poses substantial technical problems, the issue of need or demand raises both important methodologic and philosophical issues.

Two basic approaches have been developed to answer the question of how many physicians are required. The more straightforward of the two is the demand-based approach, which proceeds from some measure of the current level of use as the norm and adjusts for changes in population. The fallacy embedded in this approach is the explicit assumption that the current use patterns and levels are appropriate. The demand-based method, while conceptually simple, can be technically complex.

The competing paradigm is the needs-based approach, a normative model that calculates physician requirements based on an idealized determination of the volume of health services that a population would receive in the best of all possible worlds. Such an approach was used in one of the earliest comprehensive physician resource studies. In this ambitious effort, the consensus of a panel of experts was used to develop an estimate of the number of physician hours required to prevent, diagnose, or treat the range of conditions seen in a normal population.⁴ The more recent study of the

Graduate Medical Education National Advisory Committee (GMENAC) is in fact a variation on the needs-based model, and expert consensus panels and a modified delphic approach were used extensively in generating GMENAC's estimates of how many physicians are required.⁵

Table 1 is a summary of the structure, methods, and principal conclusions of selected major physician resource studies done over the past 60 years, spanning an era that opened with the classic work of Lee and Jones and ended with the report of the Council on Graduate Medical Education (COGME).^{3,4,6-10} As the table shows, the federal government has sponsored most of the major studies in this field. At the risk of oversimplifying, the 20th century can be conveniently divided into eras of physician shortage and of surplus, with the 1980 GMENAC report demarcating the watershed. Before 1980, the conventional wisdom proclaimed significant physician shortages, and this conclusion triggered a wide variety of public interventions, including the creation of new medical schools and a major expansion of medical school classes.¹¹ The GMENAC's main conclusion was that this fusillade of intervention had overshot the mark, transforming President Lyndon B. Johnson's 1968 proclamation of a shortage of 50,000 physicians¹² into a projected surplus of 70,000 physicians by the year 1990.

Whatever its methodologic shortcomings, the GMENAC study did not mince words. In calling for an immediate 17% reduction in medical school class size and for the severe restriction of the entry of foreign medical graduates into the United States, GMENAC threw down the policy gauntlet. The GMENAC report was readily embraced by a new administration eager to distance itself from the interventionist policies of its predecessors. As a consequence, many federal programs designed to influence physician supply or distribution were scaled back, and the federal government turned its immediate attention from problems of health care access to the more pressing problem of cost.

Yet all was not quiet on the physician resources front. The GMENAC study spawned the creation of a thriving cottage industry whose main product was research pointing out substantial errors or oversights in the committee's report. Some found the projected physician surplus illusory,¹³ but others proclaimed the prediction of physician surplus too timid.¹⁴

TABLE 1.—Selected Studies of Physician Supply in the United States, 1933–1988

Authors and Year Published	Sponsoring Organization	Methodologic Approach	Major Conclusions
Lee and Jones, 1933 ⁴	Committee on the Costs of Medical Care	Need based; consensus of experts as to physician hours required to treat specific diseases	National shortage of physicians
President's Commission on the Health Needs of the Nation, 1953 ⁶	Presidential commission	Demand model based on optimal population-physician ratios	Substantial national shortage of physicians
Bane Committee, 1959 ⁷	US Surgeon General	Demand model; postulated a minimum of 141 physicians per 100,000 population	Persistent national physician shortage
GMENAC, 1980 ⁹	DHEW	Adjusted-needs model; expert panel consensus on individual diseases adjusted for fraction of diseases treated by physicians	Impending severe physician surplus in most medical and surgical subspecialties
COGME, 1988 ⁸	DHHS	Public hearings, expert testimony, secondary data analysis	Probable physician surplus of unknown magnitude; persistent problems of geographic and specialty maldistribution
Bureau of Health Professions, 1988 ⁹	DHHS	Adjusted-demand model	Significant physician surplus (70,000 by year 2000)
American Medical Association (AMA), 1988 ¹⁰	AMA	Adjusted-demand model	No conclusion

COGME = Council of Graduate Medical Education; DHEW = US Department of Health, Education, and Welfare; DHHS = US Department of Health and Human Services; GMENAC = Graduate Medical Education Advisory Committee

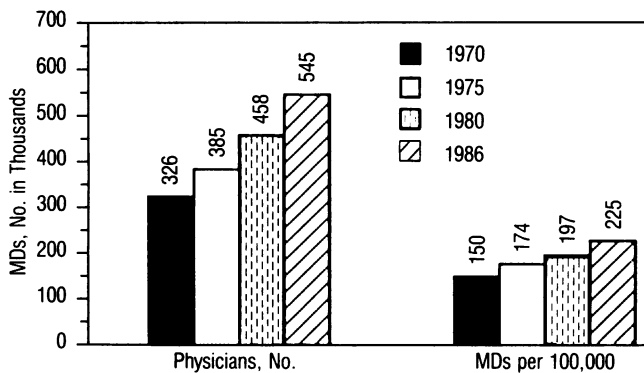


Figure 1.—The graph shows the increase in the absolute and relative supply of allopathic physicians in the United States, 1970 to 1986.

Thus it is not surprising to find that the most recent governmental pronouncement on this issue, the first report of the Council on Graduate Medical Education, is a model of vacillation.⁸ Although COGME concludes that there is likely to be an aggregate oversupply of physicians, this conclusion is draped in uncertainty. The COGME recommendation is as tentative as GMENAC's was forthright: "At the present time, the Federal Government should not attempt to influence physician manpower policy in the aggregate."⁸

Despite the lack of consensus on the adequacy of America's physician supply, the basic statistics are not in doubt, as can be seen in Figure 1. The number of medical schools increased from 87 to 126 between 1963 and 1980, and the number of medical graduates more than doubled during that same period. As a consequence, the relative supply of physicians has risen from 150 per 100,000 in 1970 to 225 per 100,000 in 1986.¹⁵ At the same time, more Americans lack basic access to health care, both the absolute and relative supply of physicians in some rural areas has decreased, and many defined population groups have more difficulty gaining access to physicians. National physician resource policy is not about physician numbers only.

How Many Doctors Can Fit on the Head of a Pin? It Depends on the Shape of the Pin

The major source of disagreement about the adequacy of America's physician supply is substantial controversy about what constitutes an optimal health care system. Perhaps the best way to illustrate this proposition is to briefly review the approaches of two respected analysts with diametrically opposed views on this issue.

William Schwartz and co-workers have been the most provocative exponents of the contrary notion that we are more likely to face a physician shortage than a surplus by the year 2000.¹³ They find many reasons to take issue with the assumptions on which GMENAC and others based their projections, but their main argument is based on the fact that the demand for medical services can be expected to continue to increase at a relatively rapid rate. The aging of the population, the advent of new diseases such as the acquired immunodeficiency syndrome, and, most important, the increasing array of technically sophisticated medical services that will be available will require more physicians. At the same time, these observers expect that more physicians will be siphoned off into non-patient care activities, largely administration and research, and that the productivity of the rest will actually decrease. Although Schwartz and col-

leagues concede that their model is subject to the vagaries of reimbursement policies and the unpredictable nature of technologic innovation, their analysis is a direct attack on the GMENAC approach and conclusions.

At the opposite end of the spectrum are those who observe that managed systems of health care—exemplified by the health maintenance organization (HMO)—use substantially fewer physicians than does the private sector. Steinwachs and associates point out that HMOs typically use 20% to 50% fewer physicians to care for children and adults, respectively.¹⁴ Tarlov uses this and other observations to argue that as the number of persons who become part of managed care organizations increases, projections for the increasing dominance of this "third compartment" of medical care will need to be adjusted.¹⁶ A typical HMO has a staffing level of about 120 physicians per 100,000 population, only about half of that in the "first compartment" or fee-for-service sector and much lower than the physician-population ratio projected for the 21st century.¹⁷

The roots of this disparity are diametrically opposed visions of what constitutes an optimal health care system. Schwartz and co-workers anticipate the further development of a highly specialized health care system in which well-trained subspecialists basically make beneficial technologies available to the population at large. In this system, subspecialists will diffuse from the academic centers into most cities of more than 50,000, and health insurance will expand to make consumers able to purchase the services purveyed by these subspecialists.¹⁸ Tarlov, by contrast, predicts the evolution of a tightly managed system of care in which costs are contained and where most care is provided by primary care physicians.¹⁶

The consequences of these differing assumptions about what the medical care system will look like are of a much greater magnitude than are the uncertainties introduced by such vagaries as the productivity of women or immigration policies for foreign medical graduates. The "third-compartment" model described by Tarlov can probably be adequately staffed by 120 physicians per 100,000 persons, whereas Schwartz and colleagues' vision of the future of medicine would comfortably employ more than twice that number. Given that the proportion of Americans who receive their medical care from managed health care organizations is likely to increase and that the quality of care in those settings appears similar to that available in the traditional fee-for-service sector, the added value provided by the additional 300,000 physicians required in an unfettered fee-for-service model should be questioned.¹⁹⁻²¹

Sources of Uncertainty: Vexing Issues in the Physician Work-force Debate

Human resource forecasting is part of a larger social dialectic. Authoritative predictions of physician shortage or surplus almost inevitably set in motion educational and social changes that start the pendulum swinging in the opposite direction. The physician shortages of the 1960s led to the governmental interventions that created the physician surplus of the 1980s.²² It is not too surprising that in the decade that has followed, there have been a restriction on foreign medical graduates entering this country, a modest contraction of some medical school classes, and a reduction in the extent to which government employs and deploys physicians.²³ The pendulum does not swing; it is pushed.

This constant recalibration of the system by which physicians are educated and licensed at least partially invalidates the basic assumptions of any specific forecasting model soon after it is published. In addition to these deliberate attempts to modify physician supply, other simultaneous social phenomena affect the attractiveness of medicine as a profession, the kind of people who choose to enter medicine, and the work habits of physicians. Perhaps most important, the aggregate physician supply is only one factor that determines whether or not certain large and important segments of the population have access to medical care. In the following section, we discuss some aspects of both the health care delivery system and the educational system that must be considered in any comprehensive discussion of physician supply policy.

The Applicant Pool

The number of medical students in the United States doubled in the past 25 years, from 7,081 in 1960 to 16,318 in 1985.¹⁵ Although the number of applicants to medical school rose commensurately until 1973, the applicant pool actually declined until leveling out in 1990.²⁴ The consequence has been a decline in the applicant-to-acceptance ratio and a shift in the composition, quality, and values of the applicant pool.²⁵

Although many explanations have been proffered for this decline in the number of persons interested in becoming physicians—from the falling status of physicians in society to the increasing expense of acquiring a medical education—the result is a smaller roster of persons to choose from. This may ultimately hasten the decisions of some of the more marginal medical schools to reduce class size or get out of the business of medical education altogether. Of equal or greater significance is that all medical schools will have more difficulty selecting incoming classes suitable to the social and intellectual mission of the medical school. As more entering students seek lucrative subspecialty careers in urban settings, schools interested in fostering rural practice or primary care may find it more difficult to achieve those objectives.

Women Physicians

The most dramatic change in the demographic composition of new physicians is the growing number of women.^{26,27} As the number of male applicants fell, the absolute number and relative proportion of women in the applicant pool quadrupled. More than a third of current medical school applicants are women, and it is expected that by the year 2010 almost a third of all physicians will be women.^{28,29}

This transformation of the medical profession from a male-dominated club to one in which women are equal partners has implications beyond merely expanding day-care opportunities for residents and their children.³⁰ Women are more likely to work in salaried settings and to work fewer hours than men, although the differences are decreasing. Women are also less likely to settle in rural areas, and they show a predilection for certain specialties. This changing demographic profile of the medical profession will tend to reduce the effective physician work force, although the magnitude of the difference is small. The growing proportion of women may also exacerbate the problem of physician maldistribution. The most pervasive effect is likely to be an augmentation of the preference of recent graduates to join sala-

ried practices in structured settings where the work conditions are at least as important as the wage.

Minority Physicians

Minorities have been consistently underrepresented among American physicians.³¹ In 1985, only 3% of US physicians were African American at a time when about 12% of this country's population was in this racial group.³² If we accept the premise that the proportion of minorities in medicine should reflect their distribution in the general population, there is a severe shortage of minority-group physicians. The evidence that these physicians are more likely to provide primary care services to underserved minority populations is a strong reason to embrace such a staffing goal.³²

The widespread perception of a physician surplus has undermined recent efforts to expand the number of minorities in medicine. The federal government's decision to cut back on financial assistance to medical students at a time of rising tuitions disproportionately affects minorities because they frequently come from poorer families.³³ As opportunities for minorities expand in other professions, and as the debt burden for medical school graduates increases, many capable potential applicants will choose other fields. Although this will have only a marginal effect on the overall applicant pool, this lack of investment in training minority physicians may ultimately reduce our ability to rectify disparities in the supply of health services to underserved minority populations.

Foreign Medical Graduates

The foreign medical graduate is a persistent wild card in the debate about physician-supply policy. In the mid-1960s, physician immigration was encouraged as a step toward alleviating the perceived physician shortage, and foreign nationals trained abroad were actually given preferential entry into the United States.³⁴ When the consensus concluded that the physician supply had overshot the desired mark, occupational preference was restricted. Subsequently, examination requirements have been made more rigorous, further restricting the influx of foreign medical graduates.³⁵ The general sentiment is that in an era of homegrown surplus, we need not depend on foreign graduates.

The contribution of foreign medical graduates to the supply of US physicians is not inconsequential; in 1983, well over 100,000 foreign graduates were practicing in this country, accounting for more than a fifth of the total physician supply.³⁶ If it were possible or desirable to eliminate foreign-trained physicians in this country, the supply of physicians would be constrained appreciably; it may be neither possible nor desirable, however. Most foreign medical graduates now enter the United States as US citizens, and it may be neither politically feasible nor fair to exclude them from the practice of medicine.³⁷ In addition, foreign-trained physicians from all countries show both tenacity and ingenuity in gaining a foothold in the United States, circumventing the immigration restrictions and transcending the more difficult licensing barriers.³⁴ Without much more draconian legislation, the tide is unlikely to ebb. Furthermore, like new immigrants in other fields, foreign medical graduates are willing and even eager to take the jobs that the homegrown product shuns. They disproportionately staff both inner-city emergency departments and isolated rural clinics, and even if the flow could be

stemmed, it might do little to ameliorate any surplus of physicians in areas that are already well served.³⁵

Geographic Maldistribution

Even as GMENAC proclaimed the impending physician glut, the committee emphasized that substantial physician shortages persisted, with the most obvious deficiencies in rural areas of America. Physicians are not uniformly distributed across the country.³ In fact, there is a tenfold difference in the physician supply of urban and rural areas, a relative disparity that persists despite the expansion of the total number of practicing physicians. Although there has been a modest increase in the number of physicians practicing in larger rural communities, many of the most isolated communities continue to be underserved altogether.³⁸

The persistent plight of rural communities has historically been a major force behind the expansion of the physician supply. The policy issue is not whether small towns should have access to physicians, but what steps should be taken to ensure that medical care is available in rural areas. The studies of Newhouse and Schwartz and associates show that the supply of board-certified physicians has increased in many nonmetropolitan areas of the United States, and these authors argue that market forces promote the diffusion of physicians into areas where competition is less.^{39,40} On the other hand, numerous studies have shown that physicians have an enormous capacity to create their own markets and to counter competitive pressures by finding new niches in apparently over-doctored urban areas.^{19,41-43} Although a diffusion of physicians exists, the deliberate creation of conditions of physician surplus is an extremely inefficient way to ensure that small towns have medical care.

Physicians tend not to choose rural practice for many reasons, perhaps the most important being that rural medicine is hard work at low pay. Many federal and state initiatives instituted in the 1970s sought to address this problem by establishing programs that selected medical students interested in rural life, prepared them appropriately for rural practice, supported them economically in their practice environments, and reduced their isolation with targeted outreach programs based in urban centers.⁴⁴⁻⁵¹ Many of these programs were abandoned with the proclamation of a physician surplus, as it became fashionable to cite the inexorable diffusion of physicians into small areas as the "invisible hand" that would remedy any residual shortage of physicians in rural areas.

It seems more sensible to acknowledge that if left to their own devices, physicians will always tend to aggregate in cities. To the extent that it is thought prudent to assure adequate medical care in rural towns, a logical role of government is to pursue redistributive policies that enhance the likelihood that physicians will locate and remain in rural communities. When placed in a larger context, the size of the problem is miniscule. Kindig and Movassaghi point out that the addition of 1,883 physicians in small rural counties would increase the supply of primary care physicians in those settings to that prevailing nationwide.³⁸ Even if the estimate of deficiency is doubled to make sure that underserved inner-city areas are addressed as well, this means only about 0.5% of physicians in practice today. It is difficult to understand why the decision has not yet been made to solve this problem as a matter of national policy.

Specialty Maldistribution—Whence Primary Care?

Given the choice, most physicians become specialists.¹¹ The reasons are not difficult to find. Specialists are paid as much as three times more than their generalist colleagues.⁵² They enjoy higher prestige, both among their colleagues and from the public at large. The medical schools where they are trained are organized according to specialties and controlled by those who have achieved their leadership positions by demonstrating their prowess in narrow scientific or clinical areas. Our academic health centers are increasingly propelled by and dependent on the fees generated by the specialty departments. And in a world where biomedical knowledge and technologic innovation are rapid and unceasing, many students find it cognitively more appealing to restrict their intellectual domain to an area that they can master in depth.

The clamor for primary care physicians originated outside of medicine, but substantive change has been largely derailed by the medical profession itself, most notably the teaching institutions that control the educational spigots.⁵³ The flourishing of primary care during the 1970s led to the creation of family medicine as a specialty and to the flowering of general internal medicine as a primary care alternative in the dominant church of American medicine.^{54,55} Yet all the primary care workers see themselves in crisis, with educational programs underfunded, residency slots unfilled, and the future uncertain.⁵⁶⁻⁵⁸

Perhaps in no other area of physician staffing policy is there greater cognitive dissonance. It is instructive to review the recommendations of COGME in this area:

There is an undersupply of physicians in family practice. There appears to be an impending undersupply of physicians in general internal medicine. Allopathic and osteopathic medical school graduates should be strongly encouraged to enter training in primary care, particularly in family medicine and general internal medicine.^{8(pxxiii)}

"Encouragement" alone will probably have little effect on specialty choice of medical school graduates. This is an area where many of medicine's leaders argue on behalf of primary care, but virtually all of the incentives for persons and institutions favor the production of specialists.

The incentives are powerful, and some are relatively invisible. The direct and indirect medical education support provided by Medicare exceeds \$3 billion annually, most going to teaching hospitals to support the training of specialists.⁵⁹ By contrast, according to F. Mullan, Director of the Bureau of Health Professions, US Department of Health and Human Services, the total federal grants for family medicine, general internal medicine, and general pediatrics were \$55 million in 1989, less than 2% of the amount that flows to hospitals through Medicare subsidies (written communication, July 1989). Specialty residents often generate revenue by helping to staff lucrative inpatient services, whereas primary care residents in the ambulatory setting are expensive to train. It is therefore not surprising that teaching hospitals are supporting the expansion of specialty training at the same time that leaders of academic health centers are decrying the dearth of ambulatory-based education and the lack of interest in primary care.⁶⁰ Add to this the billions of dollars a year that flow from the National Institutes of Health to academe for basic research—much of it carried out under the auspices of specialty departments—and the functional inconsequence of primary care to academic medicine is magnified.⁶¹ The hypocrisy is institutionalized.

As in the case of geographic maldistribution, the aggregate supply of physicians has relatively little to do with this debate. The declining interest in primary care among medical school matriculants (from 36% in 1982 to 22.5% in 1989) has occurred in the face of a rapid expansion in the number of practicing physicians⁶² and at a time when the effective demand for primary care physicians has been increasing.⁶³ The core values of both the teaching and practice establishment favor specialization. Unless something is done to change those values or the very real and immediate incentives for physicians to pursue specialty careers, the flourish that primary care enjoyed in the 1970s and early 1980s will be followed by its virtual eclipse.

Other Issues

Many other elements in the staffing discussion cannot be dealt with adequately in this short article but are worthy of brief mention. Discussing the physician work force without touching on the role of osteopathic physicians and allied health personnel is both ethnocentric and myopic. Osteopathic physicians have increased in number even more rapidly than their allopathic peers, with a 90% rise in their number from 1970 to 1986.⁹ This group has shown a commitment of graduates to both primary care and rural health care. To the extent that traditional medicine is ineffective in meeting the needs of these underserved population groups, osteopathy can be expected to continue to grow to fill the holes. The rationality of licensing two parallel health professionals with largely overlapping skills and training may be questioned, but those who select osteopathy tend to practice in settings not willingly filled by allopathic physicians.^{64,65}

Much of the discussion about physician supply is predicated on a crisp role delineation between physicians and the many other health professionals who provide direct patient services to the public, including nurse practitioners, physician assistants, midwives, and other midlevel and allied health personnel, to say nothing of nontraditional healers such as naturopaths and chiropractors. The mainstream groups grew rapidly during the past two decades, with numeric expansion driven by many of the same concerns that led to the establishment of family medicine programs and other concerns about the paucity of primary care and rural health care providers.⁶⁶ As the supply of physicians has expanded, the autonomy and scope of practice of some of these midlevel providers have been constrained, a tendency abetted by the vastly increased demand for nurses in hospitals.⁶⁷⁻⁶⁹ It should be recognized that there is nothing sacred about the current division of labor and responsibility between physicians and allied health personnel. It has been shown repeatedly that midlevel providers can competently assume many functions traditionally within the purview of physicians.⁷⁰ It certainly would be possible to devise a system of care that relied less on physicians and more on health care providers with less formal training.

Discussion and Conclusion

The question of whether there is a significant shortage or surplus of physicians can be answered only in the context of a previous decision about the dimensions of the health care system itself. If the system continues to be basically open-ended, one in which third-party payers facilitate the purchase of new medical interventions as they become available and physicians continue to be able to create a demand for their

own services, virtually all physicians in this country will remain gainfully employed.^{42,43} Although there may be temporary surpluses of certain physician specialties in certain desirable areas, even in these cases most physicians will find a profitable niche.⁴¹

If, however, a social contract is created that restrains the growth of the amount or percentage of national income directed to health care, the situation could change rapidly. If resources are limited, society will be forced to allocate a fixed set of resources among competing demands, and an increasingly structured system may render certain types of physicians and their services superfluous. In such a case, it is likely that a substantial number of physicians in the training pipeline would find themselves redundant. The untrammelled nature of private initiative in this country and our notable lack of success in restraining the growth of the health care sector make this scenario unlikely. Even in the context of a nationalized health care system, a vigorous private sector is likely to provide employment for many physicians whose contributions are too costly or too marginal for the more parsimonious public system.

The United States has a persistent health care staffing problem, but it is more than a question of how many physicians to train. More physicians are being trained than at any other point in the history of this country, yet large segments of the population experience a shortage, either because they live where physicians do not choose to practice or because they cannot afford what physicians are selling. It would be sensible to worry less about the aggregate physician supply and more about making the abundant supply of physicians available to persons who need but cannot get medical services.

This review of the many comprehensive studies of the dynamics of the health professionals equation suggests some relatively simple steps that would effectively address the real health care staffing problems of geographic maldistribution, an inadequate number of primary care physicians, and the underrepresentation of minorities. These remedies could include one or more of the following interventions:

- *Create effective demand for underserved populations.* The reason most people go without medical services is that they cannot afford to pay for them. Physicians' services are expensive, and the modalities that they marshal on their patients' behalf are more expensive still. Any universal financing mechanism will allow the poor and uninsured to greatly increase their ability to purchase physician services and will perforce serve a redistributive function as well. To the extent that financing mechanisms allow underserved populations to pay the market price for physician services, physicians will change their practice locations and their patient clientele. Money is the great leveler.

- *Differentially reward providers who practice in "less desirable" areas or care for socially disadvantaged populations.* Physicians tend to cluster in affluent urban areas. Most were raised in those environments or want to raise their children there. This tendency toward centralization is compounded by the concentration of other medical and nonmedical amenities in the major urban areas. To persuade more physicians to settle in rural communities or less well-endowed urban settings, we could pay them more.

This is not a preposterous notion. We currently do just the opposite as a matter of public policy. Rural physicians are

paid lower fees for equivalent services than their urban counterparts by such federal programs as Medicare, and inner-city physicians rely on the relatively meager reimbursement of the Medicaid program for much of their livelihood.^{47,53} Physicians can count.⁷¹ If health care professionals are rewarded with some form of bonus for working in areas where they would not otherwise settle, some of the monetary and nonmonetary inducements that now lead most physicians to congregate in the areas where they are least needed could be compensated for.

- *Use governmental inducements to directly affect the specialty and location choices of medical students.* The structure and values of the academic health centers are at the root of the problem of geographic and specialty maldistribution.^{72,73} This country's medical schools excel at research and compete effectively in the world of tertiary care but do a mediocre job of teaching and an abysmal job of meeting the needs of primary care and rural physicians. The indictment is not ours; it is borrowed from a self-evaluation exercise indulged in publicly by the leaders of the academic establishment.⁶⁰

It is hardly surprising that academic medical centers are unresponsive to broader societal needs. Full-time faculty members at most medical schools are selected, recognized, and rewarded for their research productivity and clinical prowess. Teaching is an often-neglected by-product of the process of taking care of patients, doing research, and obtaining grants, and most faculty are either indifferent or hostile to such undifferentiated callings as primary care.

What is surprising is that national health policy, despite rhetoric to the contrary, directly subsidizes the current status quo. The National Institutes of Health invest more than \$4 billion a year in research at medical schools, and these research funds directly and indirectly subsidize medical education at both the undergraduate and graduate level. An additional \$3 billion goes to teaching hospitals through Medicare's direct and indirect medical care subsidies, flexible funds used primarily to employ specialty residents to assist the hospitals in pursuing their specialty missions. By contrast, the entire grant support for programs for primary care specialties is less than \$60 million per year.

Medicare's indirect medical care adjustment is the most powerful tool available for changing the educational emphasis of academic health centers. Rather than passively reimburse these centers for their teaching programs, it would be possible to reward those hospitals whose graduates actually went into primary care in underserved areas. The key is to reward behavior, not intent. It is relatively easy for any medical center to designate a certain complement of residency positions as "primary care"; it is much more difficult to obscure the fact that the products of most medical schools end up practicing specialty medicine in affluent urban centers. Those who are successful in bucking the trend should be duly rewarded.

- *Eliminate glaring income disparities among physicians.* American physicians are well paid; with average net incomes well in excess of \$100,000 annually, few physicians are starving.⁷⁴ The destructive aspect of our current physician income policy is the enormous gap between those at the high and the low ends of the scale. Struggling pediatricians in the urban community health center would probably feel a lot better about their wages if radiologists in the next building

were not earning more than four times as much for less work and less responsibility.⁷⁵

The current structure of physician reimbursement is a testament to chance, the power of narrow cartels, and the seduction of technology. The resource-based relative value scale is a modest step toward rationalizing the payment system, but we must be somewhat skeptical about the prospect that the new payment scheme will be translated into practice unscathed.⁷⁶ Despite these concerns, nothing sends a stronger signal about society's relative valuation of different specialties than the salaries it is willing to pay.

- *Adequately fund programs, such as the National Health Service Corps, that deploy and support physicians in underserved areas.* Even in the most exquisitely designed system of care, some segments of the population will lack adequate services. Whether or not we move in the direction of a nationalized health care system, it makes sense to have a program that allows the government to deploy physicians and other health care providers to areas of particular need.

The National Health Service Corps (NHSC) constitutes an existing program with the flexibility to address most of the areas or populations that experience real physician shortages. At its peak in 1986, the NHSC had a field strength of slightly more than 3,000 health professionals, most of whom were physicians providing obligated service in return for federal scholarships received during medical school. Since then, the number of NHSC personnel has declined precipitously, falling below 1,000 in 1990.⁵⁰ A reexpansion of the NHSC to its previously funded level would create a human resource pool that could be used to address the most severe shortages in the United States, as well as improve access to medical education for poor and minority students.⁷⁷ Doubling the NHSC staffing would virtually eliminate geographic maldistribution and would do much to mitigate the health problems of inner cities.

In conclusion, the debate about the relative surplus or shortage of physicians deflects attention from more fundamental issues of the selection and training of medical students and the structure of the larger health care system. Federal and state governments have shown that they can rapidly and dramatically affect the physician supply, and the doubling of the number of physicians in the past two decades is a direct result of deliberate governmental intervention. The government has been much less successful in affecting the composition of the physicians who are trained or in influencing what they do after graduation, largely because it has tacitly supported a schedule of economic awards to both teaching institutions and individual physicians that are much more powerful signals than unreinforced rhetoric.

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